

# Algebra II Mid-Term Exam Day 1

## Multiple Choice

Identify the choice that best completes the statement or answers the question.

To which sets of numbers does the number belong?

1.  $\sqrt{31}$

- a. irrational numbers, real numbers b. integers, rational numbers, real numbers c. rational numbers, irrational numbers d. whole numbers, integers, rational numbers, real numbers

2.  $-17$

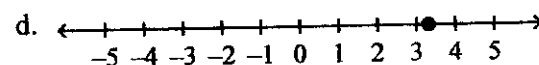
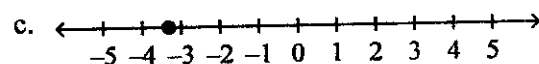
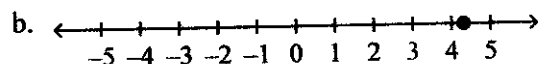
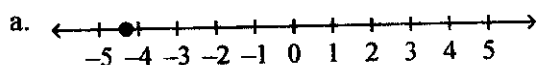
- a. integers, rational numbers, real numbers b. whole numbers, integers, rational numbers, real numbers c. whole numbers, integers, real numbers d. rational numbers, real numbers

3.  $\frac{2}{15}$

- a. integers, rational numbers, real numbers b. rational numbers, real numbers c. irrational numbers, real numbers d. rational numbers, irrational numbers, real numbers

Graph the number on a number line.

4.  $\sqrt{11}$



Insert  $<$ ,  $>$ , or  $=$  to make the sentence true.

5.  $-\frac{1}{3}$   $\blacksquare$   $-\frac{2}{5}$

- a.  $=$  b.  $>$  c.  $<$

6.  $\sqrt{3}$   $\blacksquare$   $\sqrt{7}$

- a.  $>$  b.  $<$  c.  $=$

7.  $20.28$   $\blacksquare$   $\sqrt{256}$

- a.  $<$  b.  $=$  c.  $>$

8.  $-|-16|$   $\blacksquare$   $|5|$

- a.  $>$  b.  $=$  c.  $<$

9.  $|18 + 20|$   $\blacksquare$   $|-5 - 2|$

- a.  $<$  b.  $>$  c.  $=$

Find the opposite and the reciprocal of the number.

10. 500

- a.  $-500, -\frac{1}{500}$  b.  $-500, \frac{1}{500}$  c.  $500, \frac{1}{500}$  d.  $500, -\frac{1}{500}$

11. 3

- a.  $-3, 3$  b.  $3, \frac{1}{3}$  c.  $-3, -\frac{1}{3}$  d.  $-3, \frac{1}{3}$

Name: \_\_\_\_\_

12.  $4 - \pi$

a.  $\pi - 4, \frac{1}{4 - \pi}$  b.  $4 + \pi, \frac{1}{4 - \pi}$  c.  $4 + \pi, \frac{1}{\pi - 4}$  d.  $-4 + \pi, \frac{1}{4} - \frac{1}{\pi}$

Name the property of real numbers illustrated by the equation.

13.  $-2(x + 11) = -2x - 22$

- a. Associative Property of Multiplication  
b. Distributive Property c. Commutative Property of Addition d. Associative Property of Addition

14.  $2 \cdot (\sqrt{8} \cdot 7) = (2 \cdot \sqrt{8}) \cdot 7$

- a. Distributive Property b. Associative Property of Multiplication c. Commutative Property of Multiplication d. Associative Property of Addition

15.  $\pi \cdot 6 = 6 \cdot \pi$

- a. Associative Property of Multiplication  
b. Commutative Property of Addition  
c. Commutative Property of Multiplication  
d. Closure Property

16. Simplify  $|-11 + 3|$ .

- a. 14 b. 8 c. -8 d. -14

Evaluate the expression for the given value of the variable(s).

17.  $5a + 5b; a = -6, b = -5$

- a. -55 b. 55 c. 5 d. -5

18.  $\frac{4(3h - 6)}{1 + h}; h = -2$

- a. 32 b. 48 c. -48 d. 30

19.  $|4b - 4| + |3 - b^2| + 2b^3; b = 2$

- a. 19 b. 17 c. -11 d. 21

20.  $-2x^3 - x^2 + 5x + 2; x = -3$

- a. -76 b. 62 c. 32 d. 30

Simplify by combining like terms.

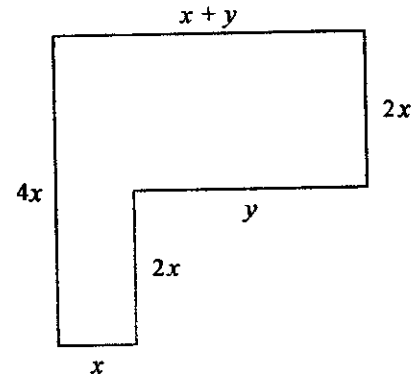
21.  $-3(-4y + 3) + 7y$

- a.  $19y - 9$  b.  $10y$  c.  $-19y + 3$  d.  $-19y - 9$

22.  $\frac{x}{2} + \frac{x^2}{3} - \frac{x}{5} - \frac{x^2}{4}$

- a.  $-x^2 - \frac{x}{3}$  b.  $\frac{x^2}{12} + \frac{3x}{10}$  c.  $\frac{2x}{3} + \frac{4x}{7}$  d.  $\frac{x}{3} - 1$

23. Find the perimeter of the figure. Simplify the answer.



- a.  $9x + 2y$  b.  $10x + y$  c.  $10x + 2y$  d.  $9x + 3y$

Solve the equation.

24.  $3y + 20 = 3 + 2y$

- a.  $-\frac{1}{17}$  b.  $\frac{2}{3}$  c. 23 d. -17

25.  $-5y - 9 = -(y - 1)$

- a.  $-\frac{1}{2}$  b.  $-2\frac{1}{2}$  c. -2 d.  $-\frac{2}{5}$

26.  $3|3x + 4| - 7 = 5$

- a.  $x = \frac{8}{9}$  or  $x = -\frac{2}{9}$  b.  $x = 0$  or  $x = -\frac{2}{3}$  c.  $x = \frac{8}{9}$   
or  $x = -\frac{2}{3}$  d.  $x = \frac{8}{9}$  or  $x = 0$

Name: \_\_\_\_\_

Solve the equation or formula for the indicated variable.

27.  $T = \frac{2U}{E}$ , for  $U$

a.  $U = \frac{T-E}{2}$  b.  $U = T + \frac{E}{2}$  c.  $U = 2T - E$

d.  $U = \frac{TE}{2}$

Solve for  $x$ . State any restrictions on the variables.

28.  $ax + bx + 9 = 7$

a.  $x = \frac{2}{a+b}; a \neq b$  b.  $x = \frac{7}{a+b+9};$

$a \neq 0, b \neq -9$  c.  $x = \frac{7}{a+b+9}; a+b \neq -9$

d.  $x = \frac{-2}{a+b}; a \neq -b$

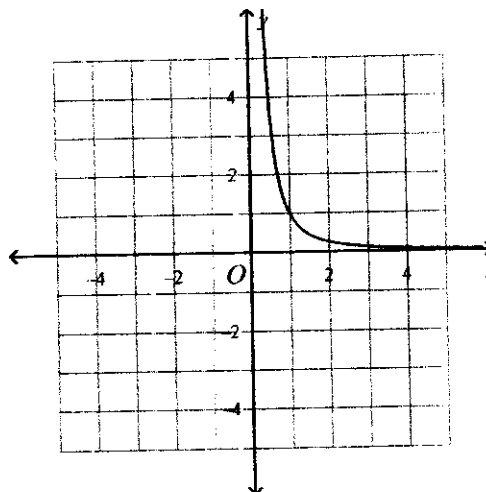
29. The sides of a triangle are in the ratio 3 : 4 : 5.

What is the length of each side if the perimeter of the triangle is 90 cm?

a. 10.5 cm, 11.5 cm, and 12.5 cm b. 22.5 cm, 30 cm, and 37.5 cm c. 7.5 cm, 11.5 cm, and 32.1 cm

d. 19.3 cm, 25.7 cm, and 32.1 cm

30. Find the domain and range of the relation and determine whether it is a function.



a. Domain: all real numbers; range: all real numbers; yes, it is a function b. Domain:  $x > 0$ ; range:  $y > 0$ ; yes, it is a function. c. Domain: positive integers; range: positive integers; no, it is not a function. d. Domain:  $x \geq 0$ ; range:  $y \leq 0$ ; no, it is not a function.

31. Suppose  $f(x) = 4x - 2$  and  $g(x) = -2x + 1$ .

Find the value of  $\frac{f(5)}{g(-3)}$ .

a.  $1\frac{5}{9}$  b.  $2\frac{4}{7}$  c.  $-2$  d. 2

Find the slope of the line through the pair of points.

32. (6, 12) and (-6, -2)

a.  $-\frac{6}{7}$  b.  $-\frac{7}{6}$  c.  $\frac{7}{6}$  d.  $\frac{6}{7}$

Write in standard form an equation of the line passing through the given point with the given slope.

33. slope = -8; (-2, -2)

a.  $8x + y = -18$  b.  $-8x + y = -18$  c.  $8x - y = -18$  d.  $8x + y = 18$

Name: \_\_\_\_\_

34. Find the point-slope form of the equation of the line passing through the points  $(-6, -4)$  and  $(2, -5)$ .  
 a.  $y + 4 = \frac{1}{8}(x - 2)$  b.  $y + 4 = -\frac{1}{8}(x + 6)$  c.  $y + 5 = -\frac{1}{8}(x + 6)$  d.  $y + 4 = \frac{1}{8}(x + 6)$

Find the slope of the line.

35.  $3x + 5y = -15$   
 a.  $-\frac{5}{3}$  b.  $\frac{5}{3}$  c.  $-\frac{3}{5}$  d.  $\frac{3}{5}$
36.  $\frac{1}{3}x + \frac{1}{2}y = 6$   
 a.  $\frac{3}{2}$  b.  $\frac{2}{3}$  c.  $-\frac{3}{2}$  d.  $-\frac{2}{3}$

Find an equation for the line:

37. through  $(2, 6)$  and perpendicular to  $y = -\frac{5}{4}x + 1$ .  
 a.  $y = \frac{5}{4}x + \frac{7}{2}$  b.  $y = -\frac{4}{5}x + \frac{38}{5}$  c.  $y = \frac{4}{5}x + \frac{22}{5}$   
 d.  $y = -\frac{5}{4}x + \frac{17}{2}$
38. through  $(-4, 6)$  and parallel to  $y = -3x + 4$ .  
 a.  $y = -3x - 6$  b.  $y = 3x + 18$  c.  $y = \frac{1}{3}x + \frac{22}{3}$   
 d.  $y = -\frac{1}{3}x + \frac{14}{3}$

Determine whether  $y$  varies directly with  $x$ . If so, find the constant of variation  $k$  and write the equation.

39.

$x$	$y$
6	24
18	72
54	216
162	648

- a. yes;  $k = 4$ ;  $y = 4x$  b. yes;  $k = 3$ ;  $y = 3x$  c. yes;  $k = 6$ ;  $y = 6x$  d. no

Determine whether  $y$  varies directly with  $x$ . If so, find the constant of variation  $k$ .

40.  $-6y = -5x$   
 a. yes;  $\frac{5}{6}$  b. yes;  $\frac{6}{5}$  c. yes;  $-5$  d. no
41.  $8y = 7x - 27$   
 a. yes; 8 b. yes; 7 c. yes;  $-\frac{7}{8}$  d. no

Find the value of  $y$  for a given value of  $x$ , if  $y$  varies directly with  $x$ .

42. If  $y = 166$  when  $x = 83$ , what is  $y$  when  $x = 23$ ?  
 a. 11.5 b.  $-11.5$  c.  $-46$  d. 46

Without graphing, classify each system as independent, dependent, or inconsistent.

43.  $\begin{cases} 12x + 3y = 12 \\ y = -4x + 5 \end{cases}$   
 a. independent b. inconsistent c. dependent

Solve the system by the method of substitution.

44.  $\begin{cases} 5x - y = 5 \\ 5x - 3y = 15 \end{cases}$   
 a.  $(0, -5)$  b.  $(-5, 0)$  c.  $(5, 1)$  d.  $(1, 5)$

45. 
$$\begin{cases} -3x - 3y + 2z = -7 \\ z = 1 \\ -2x - 3y + z = -6 \end{cases}$$
  
a. (2, 1, -1) b. (2, -1, 1) c. (-2, 1, 1) d. (2, 1, 1)

46. 
$$\begin{cases} x + y + 3z = -4 \\ -x - y - 2z = 5 \\ 2x - z = -3 \end{cases}$$
  
a. (-1, -6, -1) b. (1, -6, 1) c. (-1, -6, 1)  
d. (-1, 6, 1)

Use the elimination method to solve the system.

47. 
$$\begin{cases} -x + 2y = 10 \\ -3x + 6y = 11 \end{cases}$$
  
a. infinite solutions b. (-5, 2) c. (5, -2)  
d. no solutions

48. 
$$\begin{cases} x - 3y - z = -9 \\ -2x + y + 2z = 3 \\ 2x + y + 3z = 8 \end{cases}$$
  
a. (1, -3, 1) b. (1, 3, 1) c. (-1, 3, 1) d. (1, 3, -1)

49. 
$$\begin{cases} -4x + 4y - 2z = -8 \\ -3x - y + 4z = 0 \\ 2x - 2y + 3z = -4 \end{cases}$$
  
a. (1, -7, -2) b. (-3, 0, 5) c. (-3, -7, -4)  
d. (3, 5, -4)

50. Describe the location of the point in coordinate space.

(-7, 6, -4)

- a. From the origin, move 7 units back, 6 units left, and 4 units down. b. From the origin, move 7 units back, 6 units right, and 4 units down.  
c. From the origin, move 7 units back, 6 units right, and 4 units up. d. From the origin, move 7 units forward, 6 units right, and 4 units down.